

DEFENSE

WAYS *to the* FUTURE

DEFENSE INFORMATION

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ISSUE
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On the battlefield of the 21st century, protective suits will continue to provide the ultimate protection against nuclear, biological and chemical attacks.



DEFENSE '98 GOES ONLINE

In the spirit of the Defense Reform Initiative, this is the last hard-copy issue of *Defense* magazine.

Defense '98 will be available online in a few weeks on the American Forces Information Service home page at www.defenselink.mil/afis.

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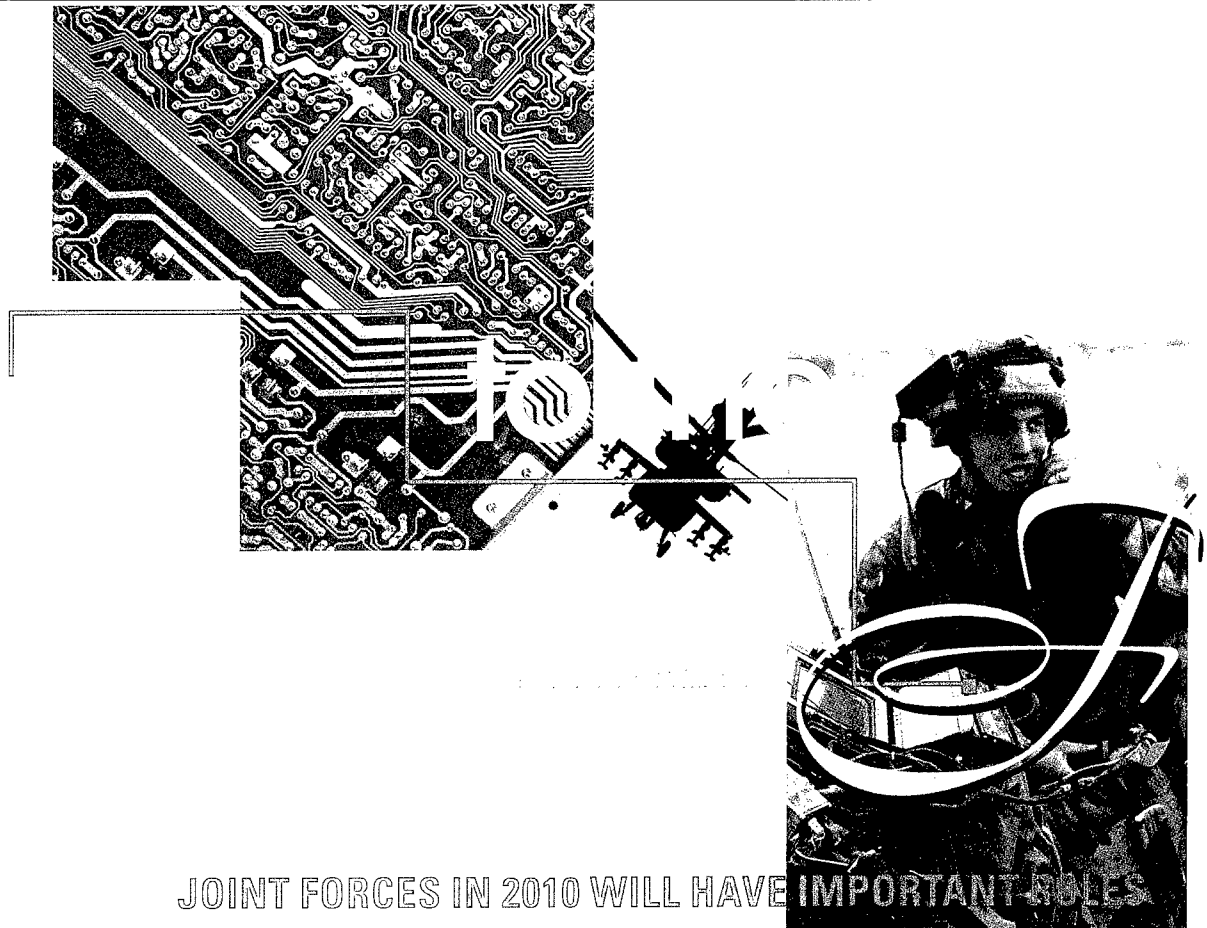
COVER: A Marine participating in Combined Arms Exercise 6-97 at 29 Palms, Calif., fires an 83mm rocket from his assault weapon while traversing a canyon under live fire to reach an objective.

DEFENSE 97 is a publication of the Department of Defense to provide official and professional information to commanders and key personnel on matters related to defense policies and interests and to create better understanding and teamwork within the Department of Defense. Published bimonthly by the American Forces Information Service, 601 N. Fairfax Street, Room 311, Alexandria, VA 22314-2007, Telephone 1-703-428-0609, DSN 328-0609. Distributed to DoD activities through the service channels. Subscriptions are sold by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20401. To place an order by credit card or for more information, call 202-512-1800 between 8 a.m. and 4 p.m. Eastern time. Jacket No. 300-734-40005. ISSN 0737-1217.

The Secretary of Defense has determined that the publication of this periodical is necessary for the transaction of the public business of the Department of Defense.

PRINT QUALITY INSPECTED

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JOINT FORCES IN 2010 WILL HAVE IMPORTANT ROLES

supporting U.S. military strategy. They will help shape the security environment in peacetime by fostering stability through overseas presence. By its very existence, a strong U.S. military in 2010 will have a substantial deterrent value.

The chairman of the Joint Chiefs of Staff issued Joint Vision 2010 in July 1996 to provide the armed services with a conceptual framework for future joint military operations. That vision premises that modern and emerging technologies, particularly information-specific advances, should make possible a new level of joint operations capability. Joint force commanders should be increasingly able to wield concentrated combat power at the decisive time and place without having to physically mass their forces.

Joint Vision 2010 addresses U.S. forces of 2010 as a joint team that

From the introduction
and Chapter 1,
*Concept for Future
Joint Operations*,
published by the
Joint Chiefs of Staff,
May 1997.

exerts full spectrum dominance — that is, it stands pre-eminent against any opponent, in any situation, in any operation, in peace or war. It linked four new operational concepts to this goal:

■ Dominant maneuver — multidimensional information, engagement and mobility capabilities to position and employ widely dispersed joint air, sea, land and space forces to accomplish the assigned operational tasks;

■ Precision engagement — systems that enable forces to locate the objective, provide responsive command and control, generate the desired effect, assess success and retain the flexibility to re-engage with precision when required;

■ Full-dimensional protection — offensive and defensive capabilities to protect all forces and facilities from attack while maintaining freedom of action during deployment, maneuver and engagement;

■ Focused logistics — fusion of information, logistics and transportation technologies to provide rapid crisis response, to track and shift assets at will and to deliver tailored logistics packages directly to the strategic, operational and tactical levels of operations.

The Joint Staff's Concept for Future Joint Operations, published in May, is the first phase of a comprehensive process that should transform Joint Vision 2010 ideas into capabilities. It is a means to explore and debate the nature of future joint force operations.

As a foundation for changes, Concept for Future Joint Operations is a living basis for assessments. Refinements will be based on assessments and will require the full collaboration of the services, combatant commands and other agencies.

The Joint Vision 2010 implementation process consists of two primary efforts:

□ Providing the defense community with common direction and strategic guidance; and

□ Guiding development and assessment of future joint warfighting concepts and operational capabilities.

Achieving Joint Vision 2010 capabilities requires a disciplined approach that projects the nature of future joint operations; assesses the merit of alternative concepts, technologies and systems; and

directs necessary changes. Concept for Future Joint Operations supports this effort as the intellectual foundation for long-term assessments. It is a market-

place of ideas, a tool to find full spectrum dominance by testing technological and operational variables in seminars, wargames, simulations, exercises and other experiments.

To achieve full spectrum dominance, the U.S. military must develop high-quality personnel, innovative leadership, joint doctrine, joint education and training, agile organizations and enhanced materiel. This in turn requires the integration of many efforts to pursue relevant 21st century capabilities.

For example, the services, combatant commands and Joint Staff will participate in refining Concept for Future Joint Operations and could structure certain exercises to examine organizational and operational options. Modeling and simulation experts will support joint advanced warfighting experiments. The DoD research and development community will explore specific materiel enhancements.

The U.S. military faces dynamic change, constrained resources, potential new roles and rapid technological advancement. With Joint Vision 2010 as the impetus and Concept for Future Joint Operations the foundation, DoD unifies its efforts to develop the right people, doctrine, organizations, training and education, leader development programs and materiel for operations in 2010 and beyond. ♦

The 21st *Century* WARRIOR

FORCE IN COMBAT

normally is provided by weapons of some type, backed by sophisticated technology that locates the enemy during day or night in any kind of weather and delivers both guided and unguided munitions with great precision. These weapons combine with technologically advanced systems that facilitate command and control, protect our fighting forces and sustain their operations throughout the course of conflict. Yet as Gen.



From Chapter 3,
*Concept for Joint
Operations*,
published by the
Joint Chiefs of Staff,
May 1997.

George Patton Jr. said, "Wars may be fought with weapons but they are won by men. It is the spirit of men who follow and the man who leads that gains the victory."

Joint operations combine human and physical dimensions. Our leaders' and warriors' training, initiative, resilience and understanding will be essential to success in future operations. Their physiological and psychological limitations also will make them a vulnerable part of our warfighting system. Their spirit and perseverance, their will to win, their dedication to the cause and their devotion to their fellow warriors are human elements. But these make the difference between victory and defeat. These will remain relevant as long as we must fight wars.

The Human Dimension

Soldiers, sailors, airmen, Marines and Coast Guardsmen — well prepared and led by competent and caring leaders — will remain key to success in future joint operations. The judgment, creativity and fortitude of our people are essential to comprehending and executing the four new Joint Vision 2010 concepts.

In the 21st century, these warriors will face a wide variety of challenges across the range of military operations. We must seek ways to empower them to fully use their potential. One is to enhance training and education — as well as physical and mental readiness — to cope with the rigors of high-tempo, high-technology combat operations in 2010 and equally essential missions associated with peacetime engagement, deterrence and conflict prevention.

Although it will influence future conflicts just as it has those in the past, technology does not negate the requirement for basic warrior skills, which include decision making, observation and empathy. Within

their commanders' overall intent, 21st century American warriors must reach their full potential in both initiative and action regardless of technology.

Skills such as vision, innovation, adaptability and creativity will allow understanding and clarification of complexities and ambiguities, even when operating under stress. Warriors must be able to make rapid, doctrinally sound decisions as they plan and execute missions in diverse, high-pressure environments.

In both combat and noncombat operations, our warriors must have trust in their systems and equipment; but more importantly, they must have complete confidence in their own abilities, in their leaders and in their comrades. To build such trust, leaders must consider physiological, psychological and ethical aspects associated with the full range of military operations.

Warriors in the 21st century will be exposed to diverse operations in different geographical environments. Those who are physically unfit or unhealthy will not withstand the rigors of combat. Conditioned warriors, healthy and reasonably rested, can persevere even under harsh conditions.

Commanders can ensure the fitness and self-confidence of their fighting forces through tough, realistic training; provision of proper uniforms and equipment; disciplined hygiene and health practices; and enforced rest.

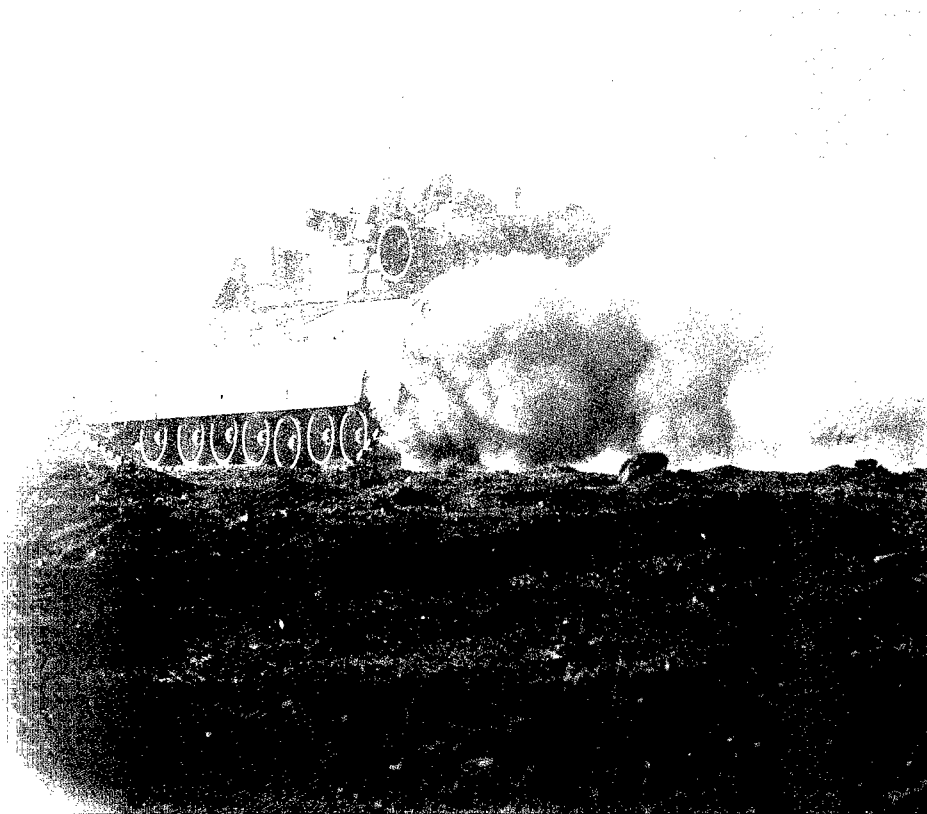
Psychological Considerations

Combat often has a greater effect on the mind than on the body. Since the mind directly affects the will to win, it must be prepared to accept the stress of combat.

The threat of weapons of mass destruction compounds psychological challenges because of the debilitating protective measures necessary to survive in such an environment. Increasingly nonlinear, widely dispersed, autonomous operations in the 2010 battlespace could create a sense of loneliness and fear unparalleled in previous conflicts. High-technology weapons can inflict casualties that also cause great psychological stress to survivors.

Even military operations that do not

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An M-1A1 tank maneuvers during a training exercise.

involve large-scale combat have their own levels of uncertainty that will stress leaders and warriors. In many operations, for example, the adversary will blend in easily with the indigenous population, exacerbating friendly uncertainty. These operations will often have rules of engagement that limit or prohibit friendly response except in life-threatening situations.

Instilling Confidence

Information superiority can help counter physical separation and uncertainty in combat and operations by keeping warriors and leaders in constant contact. Strong morale, unit cohesion, leadership and training will also counter hardships and uncertainty. Leaders must develop realistic training programs that promote individual confidence and unit capabilities. They must also understand the conditions that can lead to both combat and noncombat stress, and deal with them quickly and effectively. Well led, disciplined and mentally conditioned warriors can overcome extremes of combat.

The American people expect their fighting forces to adhere to the highest standards of professional conduct and to reflect American values: a strong respect for the rule of law, human dignity and individual rights. No matter how our technology, organizations

and weapons change, we will always require adherence to core values that have been part of our services since their inception. Despite the difficult problems we could face in the future, our fighting forces will be expected to obey established laws of warfare, to protect civilians and other noncombatants, to limit collateral damage, to respect private property and to properly treat prisoners of war. The integrity of every warrior is paramount to success in future missions.

Leadership

The dynamic nature of joint operations in the 21st century battlespace will require continued emphasis on strong leadership skills: functional experience, expertise, mental agility and self-discipline. Leadership greatly affects a joint force's ability to build and sustain combat power. Leaders inspire warriors with the will to win by providing purpose, direction and motivation. They also can infuse the people with the will to win; in many future operations, the will of the people could well be our strategic center of gravity. Leaders determine how the new operational concepts and emerging capabilities are appropriately combined to meet different requirements, ensuring these elements are effectively employed against the enemy or to control a situation.

Leaders must understand the interrelationship of military power, diplomacy, economic pressure and the media as well as the role of various agencies in achieving our national objectives. They require a sophisticated understanding of historical context and superb communications skills to perform well in the changing international environment. The evolution of command structures, the increased tempo and scope of operations, and the continuing refinement of force structure and organizations require leaders with knowledge of the doctrine and systems of all the services. They must also have the skills to operate routinely and easily as part of a joint force. In 2010, as today, commanders must be able to master both the science and the art of command. They must be skilled at:

■ Planning and executing independent operations within the higher commander's

intent, characterized by versatility and initiative, a willingness to take calculated risks and the ability to exploit opportunities;

- Developing and using detailed, understandable, flexible operations plans, characterized by communicating the intent verbally, visually and in writing while providing purpose, direction and motivation;

- Combining technology with a human dimension, characterized by tactical and technical competence and consistent building of cohesive teams;

- Rapidly grasping changes in situations, exercising initiative through independent planning and executing doctrine-based actions that maintain a steady focus on accomplishing the assigned mission;

- Integrating, synchronizing and controlling a wide array of supporting forces and capabilities when available.

When in command, leaders must infuse their units with ideas, desires, energy and methods. The personal competence and influence of commanders of large forces will have a positive bearing on the outcomes of battles and campaigns. Professional competence, personality and the will of strong commanders are significant to any unit's combat power potential.

While leadership requirements differ with unit size and type, all leaders must demonstrate character, solid values and high standards. They must act with courage and conviction, building trust and teamwork. Leaders must know where to be to make decisions and where their personal presence will influence actions.

Strong leaders and trained, motivated, dedicated warriors are the joint force commander's greatest combat multipliers. No other element is more important to developing combat power than the quality of leadership.

Education and Training

Our education and training programs must prepare joint warriors to meet the challenges that Joint Vision 2010 envisions.

Joint professional military education programs must provide our warfighters with an understanding of the strategic concepts that underlie operations. They must know

how military force will be applied, understand individual service and their reserve component systems, and appreciate how integration of these systems enhances joint operations.

Even junior leaders must understand that tactical actions can often have strategic consequences. Joint professional military education also must prepare warriors and leaders for operations that will more frequently involve a variety of governmental agencies, nongovernmental organizations and private volunteer organizations.

From the beginning of their careers, future leaders must be both educated and experienced in joint operations without sacrificing their basic service competencies. Leader development must begin with individual leader selection and extend beyond formal training and education.

Operational experience must be provided in diverse, progressive assignments that stress innovation, the need to deal with ambiguity and the application of military art and science. When possible, this experience must include operations with allies. In short, our leaders must learn and experience the very highest levels of mental and physical agility and versatility in increasingly complex joint and multinational operations.

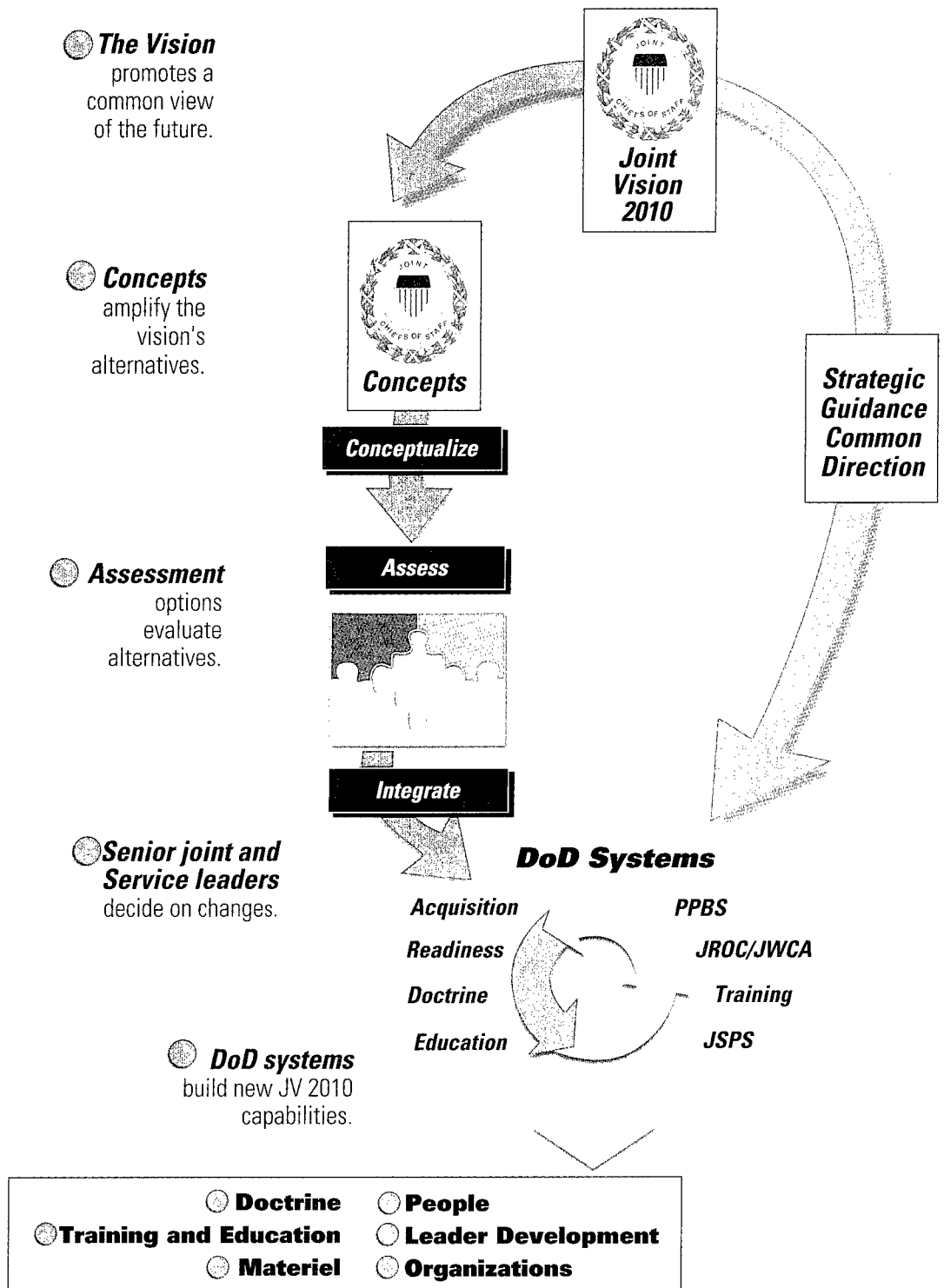
A well-rounded professional education program is vital. Self-study of the profession, its doctrine and the world in which it will be practiced is a critical element of that development. Other elements include programmed professional military education and challenging assignments in a variety of locations and positions.

Such a program will, perhaps, become more critical in the future as a smaller military force is called on more frequently to accomplish more diverse missions throughout the world. To master the complex tasks of 2010 may require our warriors, particularly our leaders, to become perpetual students of military art and supporting technologies. This does not imply the need for additional centralized classroom time, but instead the ability to leverage information systems and distance-learning capabilities in an "education-on-demand" mode.

Just as important as education is the

All leaders must demonstrate character, solid values and high standards. They must act with courage and conviction, building trust and teamwork.

IMPLEMENTATION PROCESS



requirement for realistic, stressful training that amplifies education and fully prepares our forces for joint operations. Joint education and training must emphasize integration of service and joint capabilities and develop skills that increase individual and organizational effectiveness.

Stressful training must reflect emerging threats and include the challenges of both information saturation and information flow interruption. Units and individuals must be able to adapt to operations in low-technology environments as well as in those in which all systems work as designed.

Technology

Just as technology can greatly improve the durability, reliability, security, accuracy and lethality of various systems and munitions, it can also profoundly affect the warrior and leader who will execute 2010 missions.

Lightweight materials, for example, should enable ground forces to carry more equipment and ammunition, thereby increasing individual and unit firepower.

Vision-enhancement technology will continue to improve operations after dark and in poor weather.

Rapid advances will be made in the way we collect, communicate and use information, allowing smaller staffs to perform more functions.

These advances should permit commanders complete and secure access to their entire suite of information systems from anywhere in the battlespace. Video technology and miniaturization, such as video cameras on a chip, combined with Global Positioning System and targeting technologies, could provide the capability to fire smart personal weapons and select the specific point of impact while the round is in the air.

Lightweight body armor will afford greater individual protection. The combat effectiveness of aviators could increase exponentially due to new capabilities such as supercruise, smart flight controls, smart weapons that allow multiple kills per sortie and rapid-firing solution determination. By 2010, a wide variety of improvements will

enhance a warrior's survivability, lethality, mobility and access to any relevant information sources.

Rapid information processing will revolutionize training. The 2010 warrior will receive initial or refresher training on demand, with mission-rehearsal training — perhaps in a three-dimensional, multisensory, virtual environment — quickly available. Enabling technologies could include wide-band terabyte data transfer and data processing capability, 3-D immersion, and fully interactive training systems. These technologies will enable near-real-time information to be rapidly processed, filtered as needed and assimilated by the warrior on the front line as well as the decision maker in the command post.

Scientists and developers will always be able to build systems that can outstrip individual physical and mental capabilities. Aircraft, for example, can easily exceed pilots' g-tolerances. Likewise, if appropriate safeguards are not considered, the risk of overloading 2010 warriors and commanders with information is substantial. Moreover, some effects are better achieved with people than with technology.

The challenge is to find the best mix for each situation. When considering technological advances in warfare, one must always remember the purpose of technology is to equip the man. We must not fall prey to the mistaken notion technology can reduce warfare to simply manning the equipment. Warriors and leaders are at the heart of all operations; technology and equipment help them accomplish the mission.

Conclusion

We can achieve full spectrum dominance only with a force that has courage, stamina and the intellectual ability to cope with the complexity and rapid pace of future joint operations. Just as they have in the past, military operations will continue to demand extraordinary dedication and sacrifice under adverse conditions, including close combat on the ground, at sea and in the air. The courage of soldiers, sailors, airmen, Marines and Coast Guardsmen will remain the foundation of mission success. ♦

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behind cover

T THE ARMY'S NATIONAL TRAINING CENTER, Fort Irwin, Calif., last March, infantry soldiers often took on the appearance of "robo-cops."

Tanks and Bradley fighting vehicles were as much examples of sophisticated, information-age technology as they were destructive weapons. The Hunter unmanned aerial reconnaissance vehicles whispering high above the desert floor were an eerie reminder that the battlefield of the future is here — now!

The battlefield scenes were part of the Force XXI program to create a high-tech, sustainable, versatile and more lethal Army to deal with future threats and contingencies. As such, Force XXI is the centerpiece of the Army's modernization initiatives.

Combining the latest in improved weapon systems, communications platforms and computer technology with a solid core of soldier skills, Force XXI is also the most visible Army modernization effort. But it represents neither the beginning nor the end of the Army's plans to create a force that will carry it well into the next century.

Roots of Force XXI

The Army's current modernization effort began in the late 1980s with the end of the Cold War and the collapse of the Soviet Union. The operative word became "change" — intense, rapid and unpredictable. Since 1989, more than 20 countries

have been formed or reformed.

For the Army, the end of the Cold War meant transforming from a forward-deployed force to a capabilities-based, power-projection force based largely in the United States. Since 1989, the Army has reduced end strength by 481,000 soldiers and 159,000 civilians, and reduced the active component from 18 divisions to 10. It has redeployed more than 250,000 soldiers, civilians and family members from Europe and reduced war reserve stockpiles from 20 to five.

The Army National Guard cut its ranks from 10 divisions to eight, and 10 regional support commands replaced 20 Army Reserve commands. Additionally, the Army incurred its share of cuts when DoD closed 89 U.S. installations, 662 overseas installations and 32 nuclear storage sites; as a result, its infrastructure was cut 36 percent and resources cut 40 percent compared to pre-Cold War days.

At the same time, the Army's missions began to change in scope and frequency. Operations Just Cause in Panama in 1989 and Desert Shield/Storm and Provide Comfort in 1990-91 in Southwest Asia showed just much the world had changed and how much the Army needed to change to meet the new demands.

Since 1990, the Army has been deployed

ALPHA

25 times, both home and abroad. Its roles included disaster relief, peacekeeping, humanitarian assistance, counterterrorism, security assistance, sanctions enforcement, show of force and counterdrug operations. As the premier U.S. land-based fighting force, the Army learned several clear lessons:

- The current types of missions will likely continue well into the next century.
- The Army will likely be the service of choice to conduct the majority of the operations.
- The missions will increasingly depend on joint operability.
- The missions will require rapid force

projection, enhanced communications and less dependence on massive rear support systems.

- The Army will still need to be prepared to fight major contingencies.
- Information-age technology will allow the Army to perform varied missions effectively and efficiently.

Enter Force XXI

Begun in 1992, Force XXI is the comprehensive and ongoing modernization process to take the Army to year 2010. The process consists of an interactive and linked series of evaluations, exercises and experiments influencing critical decisions about the

Spec. Brad Fowler checks his Bradley fighting vehicle's Global Positioning System during the Advanced Warfighting Experiment at Fort Irwin, Calif.



Digitization
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Army's future organization, equipment, training and doctrine.

Force XXI draws on rigorous experimentation and leverages the power of information from the foxhole to the industrial base. It seeks to exploit the revolutionary and continually advancing changes in technology to offset the reductions in military funding and personnel. Force XXI has been divided into three interdependent processes: the development of information technologies, redesign of the fighting forces, and redesign of the sustaining base. Redesign of the fighting force is the responsibility of Joint Venture, which has conceptual and experimental axes.

Digitization

At the heart of the Force XXI is digitization, the most exciting and most visible aspect of the modernization program. Digitization means applying information technologies to acquire, exchange and use timely battlefield information. Through digitization, all participants on the battlefield can share information in real time across extended distances.

Commanders will know where friendly forces are and are not. Each tank, helicopter and support vehicle, as well as each individual soldier on the ground, will have two-way, immediate access to battlefield information. Each will see its piece of the battlefield clearly as never before.

Most important, digitization will reduce confusion —the fog of war — and decrease decision-making time. It will allow for the synchronization of combat power at critical times. It will contribute to increased lethality, survivability and operations tempo while reducing the potential for fratricide.

The Army Digitization Office integrates technology and digital communications from the sustaining base to tactical and strategic levels. It identifies programming requirements, evaluates digitization efforts and works closely with the other services and coalition partners to ensure interoperability.

Battlelabs

The Army battle laboratory program accelerates the combat development process

and shortens the acquisition cycle while improving capabilities and reducing costs. The Army, developers and industry work together in the six labs to integrate technological advances with warfighting concepts. The battlelabs support different parts of the Force XXI process: early entry, mounted and dismounted battle space, command and control, depth and simultaneous attack, and combat service support.

The labs are breeding grounds for application of innovative technologies, allowing the Army to quickly and thoroughly test the feasibility of integrating technologies into battlefield experiments, and future production and procurement. Battlelab warfighting tests begin with formal hypotheses and use a combination of virtual and live simulations involving soldiers and units in tactically competitive scenarios. Some are narrowly focused exercises; others are detailed explorations of complex warfighting issues.

These detailed explorations are known as advanced warfighting experiments. They focus on specific force improvements and address doctrine, training, leader development, organizational design, material and soldier system requirements.

The Army has conducted seven such experiments since 1994:

■ Desert Hammer Six in 1994 was the first large-scale battlelab experiment. It took a battalion-sized, digitized combined arms team and experimented with doctrine, training, leader development, material and soldiers. New operational concepts resulted to capitalize on technology and the information revolution.

■ Prairie Warrior 95, a simulation-driven exercise, used a division-sized mobile strike force equipped with 21st century technologies to examine the implications of future warfighting. The exercise provided insights at nearly every Army echelon from theater to battalion.

■ Theater Missile Defense, also in 1995, was a joint test conducted in five phases. It explored ways to integrate national, joint and Army capabilities into a cohesive tactical missile defense force. The services saw significant gains in joint theater missile defense, including digital connectivity,

Patterns of

Force XXI operations are centered on six concepts.

■ Force XXI will be a power projection Army. After receiving and analyzing the mission, Force XXI's modularity will allow rapid and effective tailoring of the force based on the mission, enemy, terrain, troop and time. Army forces will be prepared to deploy directly into operations from either the United States or a forward station. The ability to do mission planning and rehearsals on automated systems and simulations, then deploy with unit equipment or marry up with pre-positioned stocks, provides operational agility and rapid reaction in crisis situations. Enroute battle command and streamlined logistics will support early operations upon arrival in theater.

■ The Force XXI force protection approach will be holistic. It will incorporate organizational, materiel and procedural solutions to the challenge of protecting soldiers, information and equipment in any operating environment. Common situational awareness enables early and accurate intelligence preparation of the battlespace, facilitates greater dispersion, more elasticity, and simultaneity-enhanced deception. The scheme of protection moves from avoiding detection, to preventing acquisition, to averting a hit, to surviving a hit. Situational awareness provides the critical means to protect the force through pre-emptive attack. Improved sensors, shooters and linkages will enable defeat of enemy attacks even before they occur.

■ *Gain Information Dominance.* This means creating a disparity between what we know about our battlespace and operations within it, and what the enemy knows. Our leaders are able to influence the battle, while enemy leadership is isolated and powerless. Even before a contingency arises, strategic information operations are conducted around the globe. Early in the projection of force, information is used to tailor the force and to plan campaigns and operations. Gaining information dominance is key to shaping the battlespace for decisive operations.

■ *Shape the Battlespace.* This means setting conditions for friendly success in decisive operations. More than traditional preparatory fires or deep battle, Force XXI sets conditions in terms not only of what we do to the enemy, but also how we posture the friendly force and take advantage of the operational environment, including terrain, weather and infrastructure. The goal is to eliminate the enemy's capability to fight in a coherent manner before committing forces to decisive operations.

■ *Decisive Operations.* Accurate situational awareness, a product of digitization, will yield more precise, effective and efficient maneuver and fires, and precision employment of dynamic obstacles and other combat multipliers. This will enable Army elements to mass effects without the risk of massing forces. Information dominance will enhance tactical surprise, so we fight when and where we want, on our terms. The end result of decisive operations is the destruction of the enemy's means and will to fight.

■ *Sustain the Force.* Force XXI operations seek to seize the initiative, dictate the tempo and maintain that tempo over time. This sustainment capability will only be realized through improved logistics. It is a combined arms effort — using solutions across doctrine, training, leadership, organization, material and soldiers — not just the responsibility of the logistician. Keys include:

Anticipatory logistics enabled by digitization.

Total asset visibility for proactive execution.

Combat service support automation systems within the Army Battle Command System.

Modular structure elements for flexibility and tailorability.

Improved battlefield distribution systems for increased speed of executing service support.

tactics, techniques, procedures, organization and training.

□ The five phases of Focused Dispatch occurred from September 1994 through August 1995. They examined the effects of digital connectivity on fire support, intelligence, logistics and battle command to see if procedural, functional and organizational changes would improve lethality, survivability and tempo.

□ Warrior Focus 95 sought to determine the implications of digitization and "own-the-night" technologies for the dismounted force. It also tested interoperability between dismounted and mounted forces. The exercise validated the importance of own-the-night technology and showed digital capabilities lead to more effective mission planning and execution.

□ Task Force XXI, conducted from August 1996 through March 1997, involved the Army's experimental force, or EXFOR. It experimented with a brigade task force, evaluating the integration of new technology, digitization and new organizational structures. From the lessons learned, the goal is to develop a force designed around information and to analyze battle command at brigade level and below.

□ The latest experiment was Division XXI from June 1997 through November 1997. It tested an interim divisional design and operational concept, battle command and information requirements, and combat support concepts. It also sought insights into digital operations above the division level and for joint operations.

Although all the advanced warfighting experiments have contributed to the Army's modernization efforts, none has generated more excitement or interest than Task Force XXI. The culminating event of Task Force XXI was conducted at the Army's National Training Center and proved a giant leap forward in creating a digitized division by year 2000.

The 1st Brigade Combat Team of the Army's 4th Infantry Division (Mechanized) is the experimental force. This unit, with its 7,000 soldiers and 2,000 vehicles, experimented with Force XXI tactics and technology for months prior to the four-week

National Training Center rotation in the California desert against formidable opposing force.

For the previous three years, Force XXI soldiers had been developing new skills and strategies and testing new equipment. The Task Force XXI experiment was its chance to put all that work together. More than 70 items were tested, including new equipment, organizations, and warfighting tactics, techniques and procedures.

Soldiers had satellite-to-laptop views of the battlefield. Enemy troops and vehicles appeared as digital icons moving across computer screens. Satellites, unmanned aerial vehicles and other long-range reconnaissance systems relayed information through command centers to onboard computers in helicopters, tanks, tracks and trucks.

Identification devices on a sampling of tanks and Bradley fighting vehicles signaled friend or foe. Night-vision equipment, thermal weapons sights, helmet-mounted cameras, voice/data radios and backpack computers with Global Positioning Satellite links combined to give both individual soldiers and commanders more information than ever before.

The effect on future division operations will be revolutionary. Every commander will have near-total battlefield awareness — a constant, complete three-dimensional picture of the land, sea and air, and identification of friend and foe. Every soldier will have situational awareness, and an entire Army division could move as one integrated battle system.

The use of information to dominate future battles will help U.S. forces maintain their superiority over any other force for the foreseeable future.

Force XXI also has revolutionized the way the Army does business. Before, technology, tactics and training were developed in sequence, creating long periods of testing and evaluation, acquisition and fielding, and implementation of tactics and training.

Force XXI soldiers work alongside industrial designers, acquisition specialists, trainers and designers. They take equipment and doctrine fresh from defense

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he Army's specialized Warfighting Rapid Acquisition Program puts promising technologies and equipment on the procurement fast track.

After the Task Force XXI advanced warfighting experiment in March 1997, the Army decided to buy several items for its digitization efforts. All 11 items will continue within the Force XXI initiatives funding through fiscal 1998, with a commitment of about \$63.1 million.

STRIKER MOBILE SCOUT — a Humvee-based scout vehicle that enhances day/night observations while providing automated targeting capability in a stealth vehicle.

MORTAR FIRE CONTROL SYSTEM — a digital system that permits integration with other artillery fire control systems on the battlefield.

GUN LAYING POSITIONING SYSTEM — substantially decreases the time to position artillery targets.

RADIO FREQUENCY TECHNOLOGY — provides the ability to track material through the distribution system.

LIGHTWEIGHT LASER DESIGNATOR RANGEFINDER — a portable unit to determine azimuth through digital data image; can target in day or night and in any weather.

COMBAT SYNTHETIC TRAINING ASSESSMENT RANGE — a battle command training system that trains commanders on combat tactics using a virtual reality battlefield.

ARMY AIRBORNE COMMAND AND CONTROL SYSTEM — provides corps, division and brigade commanders with enhanced battlefield situational awareness.

AVENGER SLEW-TO-CUE — a digital targeting system designed to detect, target and engage enemy aircraft.

PALLETIZED LOADING SYSTEM ENHANCED — improves the capability to track location and availability of logistical support.

APPLIQUE — a digital battle command information system that provides real-term situational awareness to tactical and combat support leaders.

TACTICAL INTERNET — the data link for Force XXI; provides early warning data on enemy and friendly locations.

contractors' and trainers' drawing boards and put them to use on the battlefield to determine what does and doesn't work. This has dramatically shaved the time — literally almost a decade — needed to field, test and analyze new systems.

Although results from Task Force XXI are still being analyzed, several key lessons were learned;

■ First, it is soldiers doing soldierly things who win the war, regardless of the technology, advanced communications systems or improved weapons.

■ Situational awareness — knowing the location of friendly and enemy forces — is a powerful combat multiplier.

■ The Joint Surveillance and Targeting Attack Radar System, or JSTARS, combined with unmanned aerial vehicles and a tactical internet, has proved itself a winner in achieving situational awareness.

■ Leadership training will have to be changed to help commanders adapt to and trust the rapid, computerized representations of the battlefield.

■ Finally, new tactical organizational structures have increased both efficiency and firepower.

The Task Force XXI experiment also helped the Army identify 11 items of equipment or technology to purchase under the Warfighting Rapid Acquisition Program, a



His squad mates provide cover while a 24th Infantry Division soldier prepares to fire a light anti-tank weapon during an exercise at Fort Stewart, Ga.

specially funded program that specifically capitalizes on technological advances and faster procurement.

Joint Vision 2010

Within and beyond Force XXI, the Army is working to fulfill the needs of Joint Vision 2010 and the companion framework, Army Vision 2010.

The Army action plan fulfills the spirit and specifics of the joint plan and focuses on the continued importance of land forces in the 21st century. Its focus is based on three premises.

- Most future conflicts will be in the lower or middle end of the operational spectrum, where land forces provide unique and diverse capabilities.

- Because the majority of military forces worldwide are armies, most military engagements will be army-to-army contact.

- The Army's contribution to overseas presence and power projection will continue to rise. The Army will continue to be the most visible and sustained presence and constitute the highest percentage of a joint force executing diverse operations such as Bosnia.

With these assumptions as a start, the Army's research and development, training and doctrine, and weapons modernization are all geared toward full integration with joint, multinational and nongovernmental partners. Indeed, Army Vision 2010 fuses all the modernization efforts begun after the end of the Cold War — from battlelabs to

digitization to advanced warfighting experiments and the fielding of a digitized force.

Army After Next

Even as the process and programs of Force XXI and Army Vision 2010 move forward, the Army is looking further into the future. This effort is called the Army After Next. A long-term strategic vision, it seeks not to predict the future but to prepare the Army for all contingencies that may arise in 2020 and beyond.

Armed with the lessons of Force XXI, complemented by information-age technology, planners may well envision a force entirely different from that of today or even 2010. That Army would be a logistically unencumbered force with greater lethality, versatility, and strategic and operational mobility. It would be the Army After Next.

The Army will examine the complexities of the new era through a wargaming process led by its Training and Doctrine Command. It will investigate new, potentially revolutionary technologies and then decide whether to add them to the inventory. Through this process, technologies and capabilities will be available when needed.

The Army hopes its modernization program will, in effect, radically transform how it shapes future battlefields and conducts operations.

The technology being introduced capitalizes on and complements the Army's belief soldiers on the ground doing what soldiers have always done determines the winning side.

Military operations — including peace-keeping, disaster relief and humanitarian missions — require soldiers who are skilled, well-trained, well-disciplined and well-led. They will need to adapt to complex, dangerous and rapidly changing situations throughout the world, often while operating in small groups, remote locations and ambiguous situations.

The Force XXI effort blends the skills and values of the world's top soldiers with the information-age technologies to create a U.S. Army that will be unbeatable no matter what the mission, no matter where and no matter how long. ♦

From the Sea

WITH THE PUBLICATION of ... *From the Sea* in 1992, the Navy and Marine Corps announced a landmark shift in operational focus and a reordering of coordinated priorities of the Naval Service.

This fundamental shift was a direct result of the changing strategic landscape — away from having to deal with a global maritime threat and toward projecting power and influence across the seas in response to regional challenges.

In the years since ... *From the Sea* became the Navy's strategic concept, the administration has provided expanded guidance on the role of the military in national defense. A major review of strategy and force requirements resulted in a shift in the Department of Defense's focus to new dangers — chief among which is aggression by regional powers — and the necessity for our military forces to be able to rapidly project decisive military power to protect vital U.S. interests and defend friends and allies.

In defining our national strategy for responding to these new dangers, the review emphasized the importance of maintaining forward-deployed naval forces and recognized the impact of peacetime operational tempo on the size of Navy and Marine Corps force structure. In addition to recognizing the unique contributions of the Navy and Marine Corps in the areas of power projection and forward presence, it restated the need for the Navy to support the national strategic objectives through our enduring contributions in strategic



deterrence, sea control and maritime supremacy, and strategic sealift.

Forward ... From the Sea addresses these naval contributions to our national security. Most fundamentally, our naval forces are designed to fight and win wars. Our most recent experiences, however, underscore the premise that the most important role of naval forces in situations short of war is to be engaged in forward areas, with the objectives of preventing conflicts and controlling crises.

Naval forces thus are the foundation of peacetime forward presence operations and overseas response to crisis. They contribute heavily during the transitions from crisis to conflict and to ensuring compliance with terms of peace. At the same time, the unique capabilities inherent in naval expeditionary forces have never been in higher demand from U.S. theater commanders — the regional commanders in chief — as evidenced by operations in Somalia, Haiti, Cuba and Bosnia, as well as our continuing contribution to the enforcement of U. N. sanctions against Iraq.

From the Navy's
strategic concept
published in 1994.

If deterrence
fails during
a crisis and
conflict erupts,
naval forces
provide the
means for
immediate
sea-based
reaction.

The Strategic Imperative

The vital economic, political, and military interests of the United States are truly global in nature and scope. In many respects these interests are located across broad oceans, and to a great extent they intersect those of current and emergent regional powers. It is in the world's littorals where the naval service, operating from sea bases in international waters, can influence events ashore in support of our interests.

Because we are a maritime nation, our security strategy is necessarily a transoceanic one. Our vital interests — those interests for which the United States is willing to fight — are at the endpoint of “highways of the seas” or lines of strategic approach that stretch from the United States to the farthest point on the globe.

Not surprisingly, these strategic lines and their endpoints coincide with the places to which we routinely deploy naval expeditionary forces: the Atlantic, Mediterranean, Pacific, Indian Ocean, Red Sea, Persian Gulf and Caribbean. Reductions in fiscal resources, however, dictate that we must refocus our more limited naval assets on the highest priorities and the most immediate challenges, even within these areas of historic and vital interest to the United States.

Naval forces are particularly well-suited to the entire range of military operations in support of our national strategies. They continue the historic role of naval forces engaged in preventive diplomacy and otherwise supporting our policies overseas. Moreover, forward-deployed naval forces — manned, equipped, and trained for combat — play a significant role in demonstrating both the intention and the capability to join our NATO and other allies, as well as other friendly powers, in defending shared interests. Finally, if deterrence fails during a crisis and conflict erupts, naval forces provide the means for immediate sea-based reaction. This could include forcible entry and providing the protective cover essential to enabling the flow of follow-on forces which will be deployed, supported, and sustained from the continental United States.

In short, forward-deployed naval forces

will provide the critical operational linkages between peacetime operations and the initial requirements of a developing crisis or major regional contingency.

Peacetime Forward Presence

Naval forces are an indispensable and exceptional instrument of American foreign policy. From conducting routine port visits to nations and regions that are of special interest, to sustaining larger demonstrations of support to long-standing regional security interests, such as with UNITAS exercises in South America, U.S. naval forces underscore U.S. diplomatic initiatives overseas. Indeed, the critical importance of a credible overseas presence is emphasized in the president's 1994 National Security Strategy: “... Presence demonstrates our commitment to allies and friends, underwrites regional stability, gains U.S. familiarity with overseas operating environments, promotes combined training among the forces of friendly countries, and provides timely initial response capabilities.”

In peacetime U.S. naval forces build “interoperability” — the ability to operate in concert with friendly and allied forces — so that in the future we can easily participate fully as part of a formal multinational response or as part of “ad hoc” coalitions forged to react to short-notice crisis situations. Participation in both NATO Standing naval forces and in a variety of exercises with the navies, air forces, and land forces of coalition partners around the Pacific rim, Norwegian Sea, Arabian Gulf and Mediterranean basin provide solid foundations for sustaining interoperability with our friends and allies.

Additionally, the outreach to the former Warsaw Pact countries in the NATO Partnership for Peace program will further build solidarity and interoperability. We have already made solid progress in expanding and intensifying our cooperation with the navies in Eastern Europe which included units from Bulgaria, Estonia, Latvia, Lithuania, Poland, Romania, Russia and Ukraine.

U.S. forward-deployed naval forces have also contributed to humanitarian assistance

and disaster-relief efforts — from the Philippines to Bangladesh to Rwanda — with similar, very positive, results.

Although naval presence includes a wide range of forward-deployed Navy and Marine Corps units afloat and ashore in friendly nations, our basic presence “building blocks” remain aircraft carrier battle groups — with versatile, multipurpose, naval tactical aviation wings — and amphibious ready groups — with special operations-capable Marine expeditionary units. These highly flexible naval formations are valued by the theater commanders precisely because they provide the necessary capabilities forward: ready and positioned to respond to the wide range of contingencies and available to participate in allied exercises, which are the bedrock of interoperability.

We have also turned our attention to examining the naval capabilities that could contribute to extending conventional deterrence. In this regard, forward-deployed surface warships — cruisers and destroyers — with theater ballistic missile defense capabilities will play an increasingly important role in discouraging the proliferation of ballistic missiles by extending credible defenses to friendly and allied countries. By maintaining the means to enhance their security and safety, we may reduce the likelihood that some of these nations will develop their own offensive capabilities. Our efforts will thereby slow weapons proliferation and enhance regional stability.

In addition, even as we have shifted our emphasis to forward presence and power projection from sea to land, the Navy continues to provide a robust strategic nuclear deterrent by maintaining strategic ballistic missile submarines at sea. As long as it is U.S. policy to ensure an adequate and ready strategic nuclear deterrent, our highly survivable strategic ballistic missile submarines will remain critical to national security.

Crisis Response

U.S. naval forces are designed to fight and win wars, as are all elements of our



military arsenal. To successfully deter aggressors, we must be capable of responding quickly and successfully in support of U.S. theater commanders. Forces deployed for routine exercises and activities undergirding forward presence are also the forces most likely to be called upon to respond rapidly to an emerging crisis. The potential for escalation dictates that presence forces must be shaped for missions they may encounter. This provides theater commanders with credible crisis-response capabilities in the event normal conditions or outcomes do not turn out as we expect.

Building on normally deployed forces, we can mass, if the situation requires, multiple aircraft carrier battle groups into carrier battle forces, amphibious ready groups with embarked Marine expeditionary units, and as needed project our naval expeditionary forces ashore using the afloat Maritime Prepositioning Force. Such a massing of naval units can be complemented by Army and Air Force deployments to provide a joint force capable of the full range of combat operations that may be required.

A U.S. warship is sovereign U.S. territory whether in a port of a friendly country or transiting international straits and the high seas. U.S. naval forces operating from highly mobile “sea bases” in forward areas are therefore free of the political encumbrances that may inhibit and otherwise limit the scope of land-based operations in

Marines aboard the USS Constellation lift a medium range air-to-air missile before loading it on an aircraft. The carrier was in the Persian Gulf enforcing no-fly zones in Iraq.

The power-projection capabilities of specifically tailored naval expeditionary forces can contribute to blunting an initial attack and, ultimately, securing victory.

forward theaters. The latter consideration is a unique characteristic and advantage of forward-deployed naval forces. In many critical situations, U.S. naval forces alone provide theater commanders with a variety of flexible options — including precise measures to control escalation — to respond quickly and appropriately to fast-breaking developments at the operational and tactical levels.

Whether surging from adjacent theaters or from continental U.S. deployment bases, naval forces are uniquely positioned, configured and trained to provide a variety of responses in the event of an unexpected international crisis. Their operational flexibility and responsiveness are a matter of record.

Regional Conflict

Naval forces make a critical contribution in a major regional contingency during the transition from crisis to conflict. Forward naval forces deployed for presence and reinforced in response to an emerging crisis can serve as the transition force as land-based forces are brought forward into theater.

Using a building-block approach, U.S. naval forces can be “tailored” with specific capabilities. The resulting naval expeditionary force — conceptually built around fleet operational forces and a forward-deployed Marine expeditionary force — can provide a highly flexible force for a wide range of missions, including long-range strike operations and early forcible entry, to facilitate or enable the arrival of follow-on forces.

Focusing on the littoral area, Navy and Marine Corps forces can seize and defend advanced ports and airfields to enable the flow of land-based air and ground forces, while providing the necessary command and control for all joint and allied forces. The power-projection capabilities of specifically tailored naval expeditionary forces can contribute to blunting an initial attack and, ultimately, assuring victory. The keys to our enabling mission are effective means in place to dominate and exploit littoral battlespace during the earliest phases of hostilities.

Moreover, the unique capabilities inherent in naval tactical aviation operating from our sea bases or expeditionary airfields, as well as the capability to contribute to sustained land combat operations, provide theater commanders with flexibility in the conduct of littoral operations. Throughout the 20th century, Marine air-ground task forces placed ashore initially as an enabling force have fought and contributed decisively in every major ground conflict. Similarly, naval tactical aviation has made pivotal contributions when the nation’s air power was needed in combat.

In the event of a future regional conflict, U.S. naval forces will assume critical roles in the protection of vital sealift along the strategic lines of approach to the theater of conflict including the air- and sea-ports of debarkation. Our success in a major regional contingency will depend upon the delivery of heavy equipment and the resupply of major ground and air elements engaged forward. Sealift is the key to force sustainment for joint operations, and we are committed to a strong national capability.

Joint and Combined Operations

No single military service embodies all of the capabilities needed to respond to every situation and threat. Our national strategy calls for the individual services to operate jointly to ensure both that we can operate successfully in all warfare areas and that we can apply our military power across the spectrum of foreseeable situations — in peace, crisis, regional conflict and the subsequent restoration of peace.

The enhanced combat power produced by the integration of all supporting arms, which we seek to attain through joint operations, is inherent in naval expeditionary forces. For example, the aircraft carrier battle group integrates and focuses diverse technologies and combat capabilities to assure the dominance of the air, surface and sub-surface battle space necessary for the prosecution of subsequent campaigns. Further, Marine expeditionary forces, employing Marine air-ground task force combined-arms doctrine, are the most versatile expeditionary force in existence.

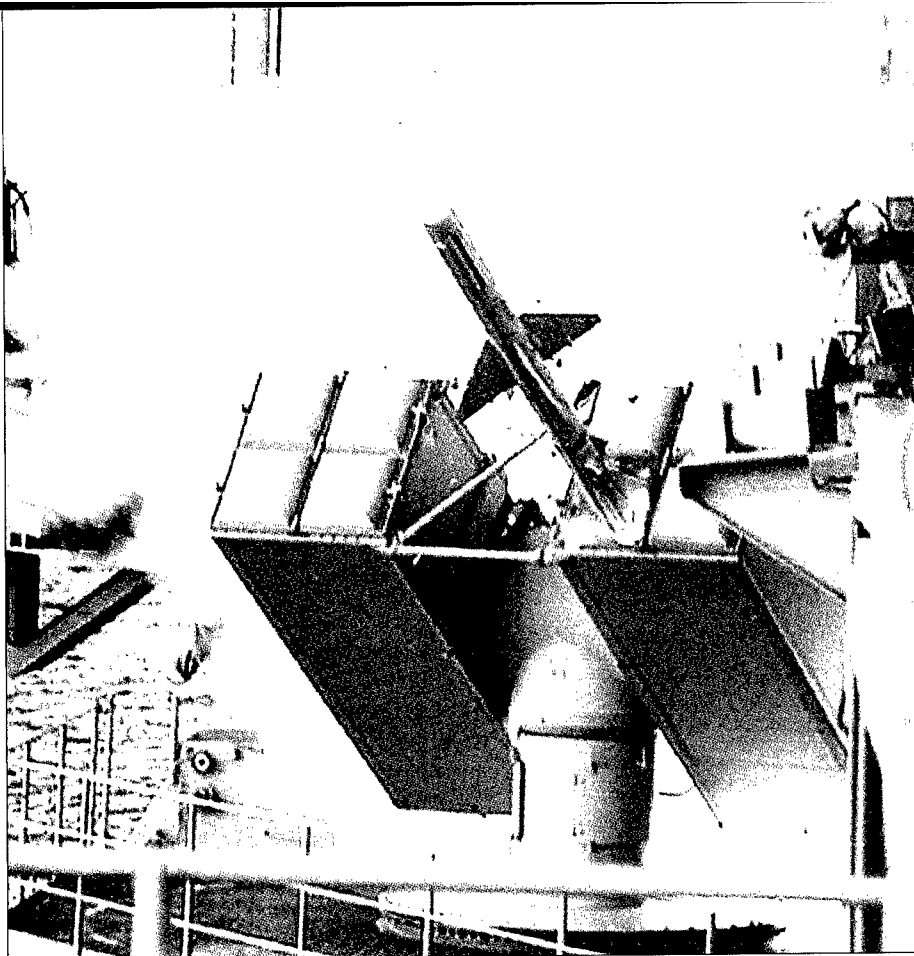
Established by law to be "forces of combined arms, together with supporting air components," the task forces are expeditionary, rapidly expandable air-ground formations, capable of operating from sea bases, ashore, or both, simultaneously. They are the model for the joint air-ground task forces evolving as conflicts grow smaller and the forces available grow fewer.

Naval expeditionary forces have long operated as integral elements of joint forces acting with other joint or allied sea, land, air, and space forces. Just as the complementary capabilities of Navy and Marine Corps forces add to our overall strength, combining the capabilities and resources of other services and those of our allies will yield decisive military power.

Maintaining Our New Direction

The new direction for the naval service remains focused on our ability to project power from the sea in the critical littoral regions of the world. We remain committed to structuring our naval expeditionary forces so that they are inherently shaped for joint operations, with the emphasis on operations forward from the sea, tailored for national needs. Recent Department of the Navy budget decisions, which resulted in a real increase in spending on littoral warfare and the means for power projection, are illustrative of the shift in priorities we have undertaken since the publication of *... From the Sea*. As we continue to improve our readiness to project power in the littorals, we need to proceed cautiously so as not to jeopardize our readiness for the full spectrum of missions and functions for which we are responsible.

Since *... From the Sea* was published, we have expanded on and capitalized upon its traditional expeditionary focus. "Expeditionary" implies a mind set, a culture and a commitment to forces that are designed to be deployed forward and to respond swiftly. Our new direction provides the nation: naval expeditionary forces shaped for joint operations tailored for national needs operating *Forward ... From the Sea*.



Conclusion

... From the Sea was the initial step in demonstrating how the Navy and Marine Corps responded to the challenges of a new security environment. Our strategy and policies continue to evolve as we learn from our recent experiences and prepare for the new challenges and opportunities of this highly dynamic world. Naval forces have five fundamental and enduring roles in support of the National Security Strategy: projection of power from sea to land, sea control and maritime supremacy, strategic deterrence, strategic sealift, and forward naval presence. We will continue to carry out these roles to protect vital U.S. global interests, citizens, allies and friends, wherever they may be at risk.

The Cold War may be over, but the need for American leadership and commensurate military capability endures. Many of our most vital interests remain overseas where the Navy and the Marine Corps are prepared for new challenges — forward deployed, ready for combat and engaged to preserve the peace. ♦

The USS Stennis fires a Sea Sparrow missile during a recent exercise.

The st *Century* **MARINE TEAM**

ANY THOUGHTS ABOUT THE U.S. MARINE CORPS' future would be incomplete unless they are in the context of the Navy-Marine Corps team.

The future comes with uncertainty and change, and it often makes some people uncomfortable. Uncertainty and sorties into the unknown have been facts of life for the Navy-Marine Corps team since 1804, when President Thomas Jefferson sent a three-ship expeditionary force under Commodore Samuel Barron to combat a group of transnational mercenaries in what is now known as Libya. The sea and land campaign that followed featured an amphibious landing, a 600-mile overland march to attack the enemy rear and naval gunfire support for 1st Lt. Presley O'Bannon's Marines as they stormed the citadel in Derna, Tripoli.

That mission demonstrated early on in U.S. history the naval services' ability to deal successfully with a complex, uncertain world. Two centuries of experience have proven there is no certainty whether you are

looking at an amphibious assault following a two-month transit under sail to the Mediterranean or are trying to project requirements 20 years into the future.

The Marine Corps and the Navy eagerly anticipate the future and believe the 21st century will be a naval century.

Before discussing what is changing, look at what isn't. First, the United States is a maritime nation. Always was, always will be. Second, to be a player in this increasingly economically interdependent world, the United States must be able to project military forces overseas, sustain those forces, enhance stability and prevent conflict, if possible, but win decisively when committed.

The Marine Corps and the Navy can thrive in the future by maintaining an institutional anchor in traditions while aggressively pursuing new opportunities.

So much for what isn't changing. Just about everything else will. The 21st century will bring with it a wide variety of new threats, but perhaps the greatest threat to the United States will flow from its dominance over the past 50 years. America won the Cold War and stands alone as a world military superpower — the champions.

Changing Game

In some ways, the U.S. military is like the Super Bowl champion team. It has the best coaches, players, equipment and is the odds-on favorite to win next year's Super Bowl. America has no reason to change a thing — but it had better. It must: The

Marines for Marine Expeditionary Unit Service Support Group-26 fire a .50-caliber machine gun during a mounted live fire exercise at Fort A.P. Hill, Va.



game is changing, and so are the rules.

What if the opposing team demanded a hockey game because it knew it couldn't win at football? That is exactly what future opponents are planning to do. As America prepares for another year of football, opponents have been learning to play hockey and sharpening their skates.

The hard part is explaining to fans why last year's winning strategy needs an overhaul. Well, history is chock-full of examples of war-winning military organizations that lost the next time because they ignored the changing times.

The Prussians before Napoleon, the French before the German blitzkrieg and the Russians before Chechnya — their future vision was one of past glory right up until they raised the white flag.

The 21st century will be the century of chaos. Burgeoning urban populations threaten developing nations with poverty, hunger and unrest.

Ethnic and religious strife respect no state boundary. The technological revolution places high-powered computers and communications systems into the hands of anyone with the money — including organized crime, terrorists and gangs.

The proliferation of weapons of mass destruction, specifically chemical and biological agents, adds a frightening new dimension to conflict. These weapons are no longer solely associated with superpowers. If a small cult in Japan can get its hands on nerve gas, anyone can.

The global economic center of gravity is shifting from the West to the East. China and India are emerging economic superpowers. South Korea, Taiwan, Hong Kong, Thailand, Malaysia, Indonesia and Singapore all have projected growth rates far exceeding any Western competition. If current trends continue, the Pacific-Indian Ocean littoral will contain eight of the 10 largest economies in the world by the year 2020. Major implications arise from this shift to the East.

First, these economies will require vast amounts of Persian Gulf oil — oil that must transit sea lanes replete with regional choke points.



Lance Cpl. Matthew Cambell shouts "Hooah" during Baltic Challenge '97 — an exercise in the spirit of Partnership for Peace in Estonia.

Uneven population growth, arms proliferation, pollution, finite resources and long-standing rivalries will increase the likelihood of conflict as competitors vie for advantage. A regional arms race has already begun.

Third, the vast expanse of the Pacific and Indian oceans, the region's fragmented geography and limited U.S. access to forward bases requires that America maintains a robust naval power-projection capability.

Tailor-made Challenge

The geography of the Pacific, Indian Ocean, Persian Gulf littoral presents long-term geostrategic challenges tailor-made for naval forces. To influence events in this region in the 21st century, America will need forces versatile enough to handle a wide range of tasks, adaptable to different threats and powerful enough to win decisively when committed. The Marine Corps and Navy have provided that kind of force in the past and will be that force in the future.

The naval services must embrace change, and that means more than buying new equipment and adapting to new technology. They need change fueled by a vision of the future.

The Marine Corps and the Navy eagerly anticipate the future and believe the 21st century will be a naval century.

Since the Civil War, the U.S. approach to war has emphasized industrial power and attrition. U.S. forces won by overwhelming the enemy in numbers and efficiently killing far more enemy soldiers, tanks, aircraft and ships than they lost. That won't be enough the day after tomorrow because a force that can fight an improved Desert Storm may be helpless against the complex, asymmetrical threats ahead.

The 20th century "industrial/attrition" mindset must be replaced by one that blends high technology and maneuver warfare with the advantages of sea-basing, or "Operational Maneuver From the Sea."

The requirement for operational maneuver from the sea flows from 21st century political and economic realities and the fact that geography generally will not change. The tyrannies of distance will remain. Quite simply, distance equates to time, and time is leverage. The more immediate and adequate the U.S. response, the more it influences events.

The chaos looming in the littorals will require the United States to project power where forward bases may be nonexistent or vulnerable to aggressors. This means the Navy and Marines must be ready at a moment's notice to do it all — everything from humanitarian relief to high-intensity conflict.

The Marine Corps knows it must be ready to go anywhere, do anything, against any foe and win. Guaranteed.

Several major procurement programs will greatly aid the Marine Corps in matching

operational maneuver doctrine with execution. Most notable among these are the V-22 Osprey, the advanced amphibious assault vehicle, short take-off and vertical landing aircraft, the joint strike fighter and the new LPD-17-class amphibious assault ship. With these preparations comes an institutional commitment to change.

The Marine Corps must continually adapt, improvise and innovate not only weapons but organization. One approach is the Marines' warfighting laboratory, activated in October 1995. It is the Corps' centerpiece for operational reform.

The lab is investigating new, potential technologies and evaluating their impact on organization, equipment, education and training. Innovation requires risk, and some experiments and initiatives will undoubtedly fail. In fact, some already have. If we push innovative technology only where we expect it to go, our experiments will work, but we may miss discovering all its possibilities.

The warfighting lab just conducted Hunter Warrior at 29 Palms, Calif., its first in a series of advanced warfighting experiments. In the exercise, an experimental Marine expeditionary unit-sized air-ground task force faced a regimental-sized combined arms force. There were several issues.

■ How can small units be made more effective on a dispersed, extended battlefield?

■ How can a command, control, communication, computer and intelligence system be built in which information is shared all the way down to the small-unit level?

■ How can logistical support to front-line tactical units be improved?

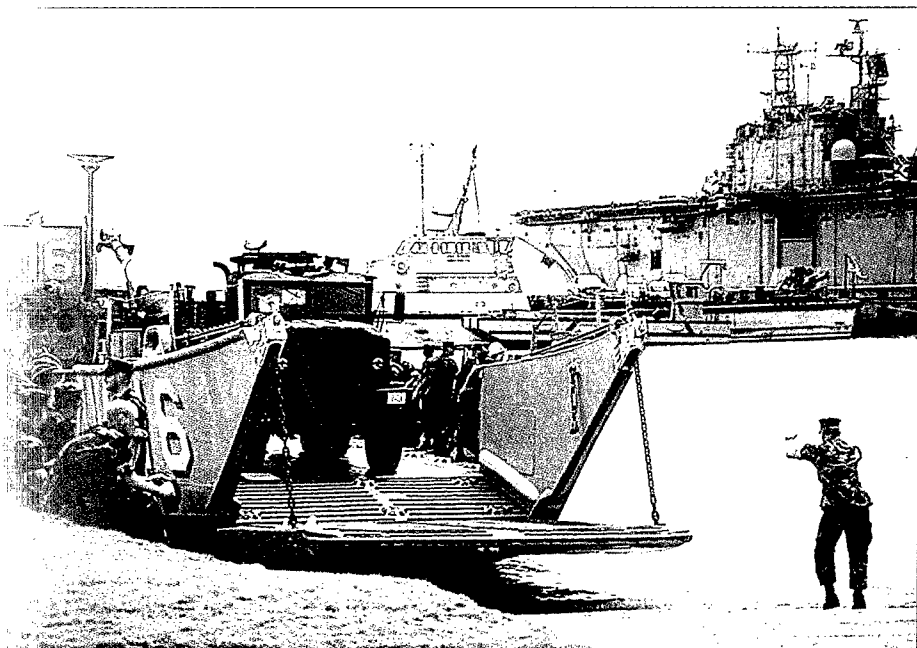
■ How can the ways enemy forces are targeted and attacked be improved?

■ What training requirements are called for by this type of future battlefield?

Some of the experiments were impressive, and some weren't. This exercise highlighted three things:

■ Give Marines a new warfighting tool and they'll quickly determine if it is "fieldworthy" and then figure out ways to make it work far better than anyone thought possible.

A Marine gives the OK to raise the loading ramp of a landing craft, utility at Okinawa, Japan.





■ Those Marines will take that new equipment and technology and discover uses for it that even the designers never thought of.

■ The experiments reinforced Marine leadership's conviction to equip the man, not man the equipment. Equip the man and there's virtually no limit to how far he can go. Man the equipment and technology sets the limits.

The next experiment will be tougher than Hunter Warrior. This time the fighting won't be in the open terrain that Marines are trained on and equipped for today. They'll fight in the most difficult of all operating environments — cities. Why? Because if there is combat in the 21st century, that's where most of it will take place.

Every potential bad guy on the planet watched CNN during Desert Storm and saw what the United States and its coalition partners did to the Iraqis. They also watched the United States in Somalia and saw its Achilles heel. The lesson was not lost on them: They will fight where they believe

America is weakest.

Urban Warrior, the next experiment, will not be easy, but it has to be done. As in Hunter Warrior, individual sailors and Marines will be empowered and free to find solutions for fighting the nation's battles in the 21st century.

A study of the 1930s and early 1940s will show the Navy and the Marine Corps did their best work when they innovated as a team. The demands of the World War II bore testament to that. Many times since, the Navy-Marine Corps team has found solutions for seemingly insurmountable problems in wartime by probing the realm of the possible in peacetime. Like yesterday, there is no room on today's team for naysayers or people happy with the status quo.

The answers to the problems of the 21st century are with the service members on duty today. The first step is breaking the shackles of our 20th century mindset; we have to do that together as a naval service. If we can do that, the rest will be easy. ♦

A Marine squadron maneuvers during a training exercise.

The Marine Corps knows it must be ready to go anywhere, do anything, against any foe and win. Guaranteed.

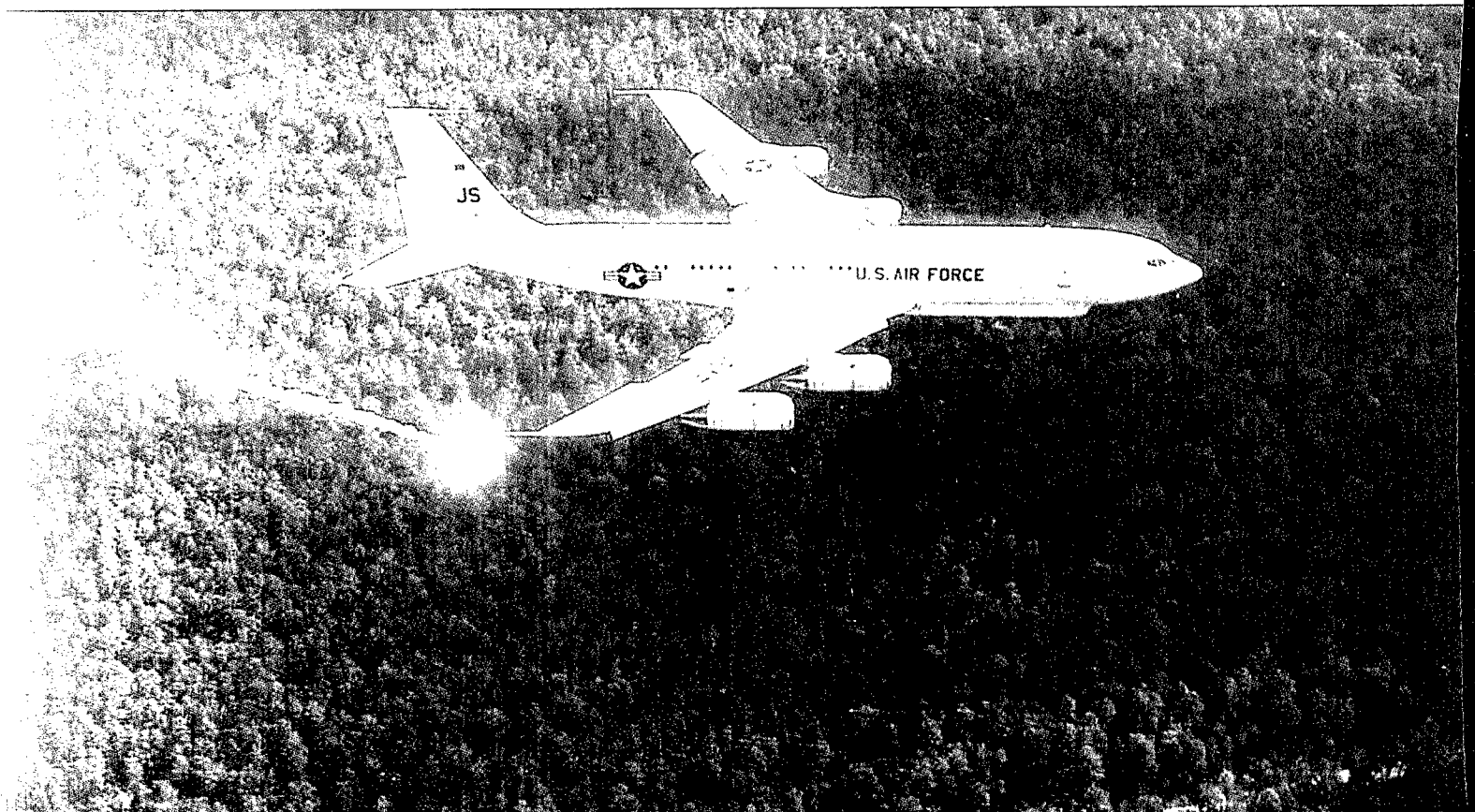
FOR THE FUTURE

unimagined threats to its security in the 21st century. However, four fundamental threats figure prominently:

- Migration of conflict to space;
- Proliferation of nuclear, biological and chemical weapons;
- Turmoil and chaos in nontraditional environments; and
- Threats to the U.S. homeland.

Meeting future threats to U.S. and global security requires dramatic new resources and methods, and each military service is undergoing enormous transitions to prepare for future adversaries.

A Joint Surveillance and Targeting Attack Radar System aircraft drops a flare during testing.



for the 21st Century

Like its sister services, the Air Force is now developing strategies and capabilities to deal with these threats. As a follow-on to DoD's document for change, "Joint Vision 2010," the Air Force developed a long-range plan for the first 25 years of the 21st century. The plan calls for the Air Force to become and remain the world's pre-eminent space and air force.

But technology alone won't sustain the Air Force or enable it to attain its lofty goals. Air Force people must continue to adhere proudly to a set of core values that places service before self and stresses the unalterable traits of integrity and professionalism.

A new approach to planning also is necessary as the Air Force responds to the future environment. To meet the changing nature of threats and military operations, the Air Force developed a strategic vision and redefined its core competencies. Designed to provide joint force commanders robust and flexible capabilities, the Air Force's core competencies include:

■ **Air and space superiority** — Provides joint commanders freedom from attack and freedom to attack; allows joint forces to dominate enemy operations in all dimensions (land, sea, air and space).

■ **Global attack** — The ability to rapidly attack anywhere on Earth at any time, giving unified commanders in chief tailored air and space capabilities.

■ **Rapid global mobility** — Continuous, timely, responsive airlift support to joint forces and multinational efforts will allow the United States to respond quickly and decisively to unexpected challenges.

■ **Precision engagement** — Enables U.S. forces to locate the target, provide responsive command and control, apply effective

force, assess the level of success and retain the ability to re-engage when required. Precision engagement means exactly that — the ability to deliver the desired effect reliably and with minimal risk and collateral damage.

□ **Information superiority** — The ability to collect, control, exploit and defend information while denying an adversary the same capabilities. This competency will provide military commanders an integrated, interactive picture of the entire battlespace.

□ **Agile combat support** — Allows combat commanders to improve the responsiveness, deployability and sustainability of U.S. forces through air and space power. This capability will enable a shift from massive deployed forward support to forces tailored for rapid mobilization.

At a fall 1996 conference, senior Air Force leaders decided on a host of initiatives to strengthen these core competencies. They based these actions on their judgment of what it will take to sustain the core competencies in the uncertain and changing context of the 21st century. An official report, "Global Engagement: A Vision for the 21st Century Air Force," summarizes the leaders' decisions and directions. The following narrative summarizes some of the directives.

Integrating Air and Space

Increased reliance on commercial, space-based assets will require increased protection of those assets. To be able to provide such protection, the Air Force must fully integrate space and air into all its operations. The long-range plan calls for new doctrine and strategies and a new

The Air Force developed a strategic vision and redefined its core competencies.

concept of operations for future joint, Air Force, civil and commercial space operations.

In reshaping itself as a space and air power, the Air Force must:

- ☐ Determine and implement the best enabling organizational structure for an integrated space and air force;
- ☐ Continue to standardize space support infrastructure, systems and processes with existing Air Force support;
- ☐ Identify the optimal force structure for the 21st century to exploit the strengths of air and space capabilities;
- ☐ Explore the need for, and legal ramifications of, a space support organization within the Air Force to provide space flight plan advisories and clearances, collision avoidance advisories and accident investigations.

The Air Force seeks to become the national security leader in integrating and harmonizing military space programs. This doesn't imply it will "own" U.S. space

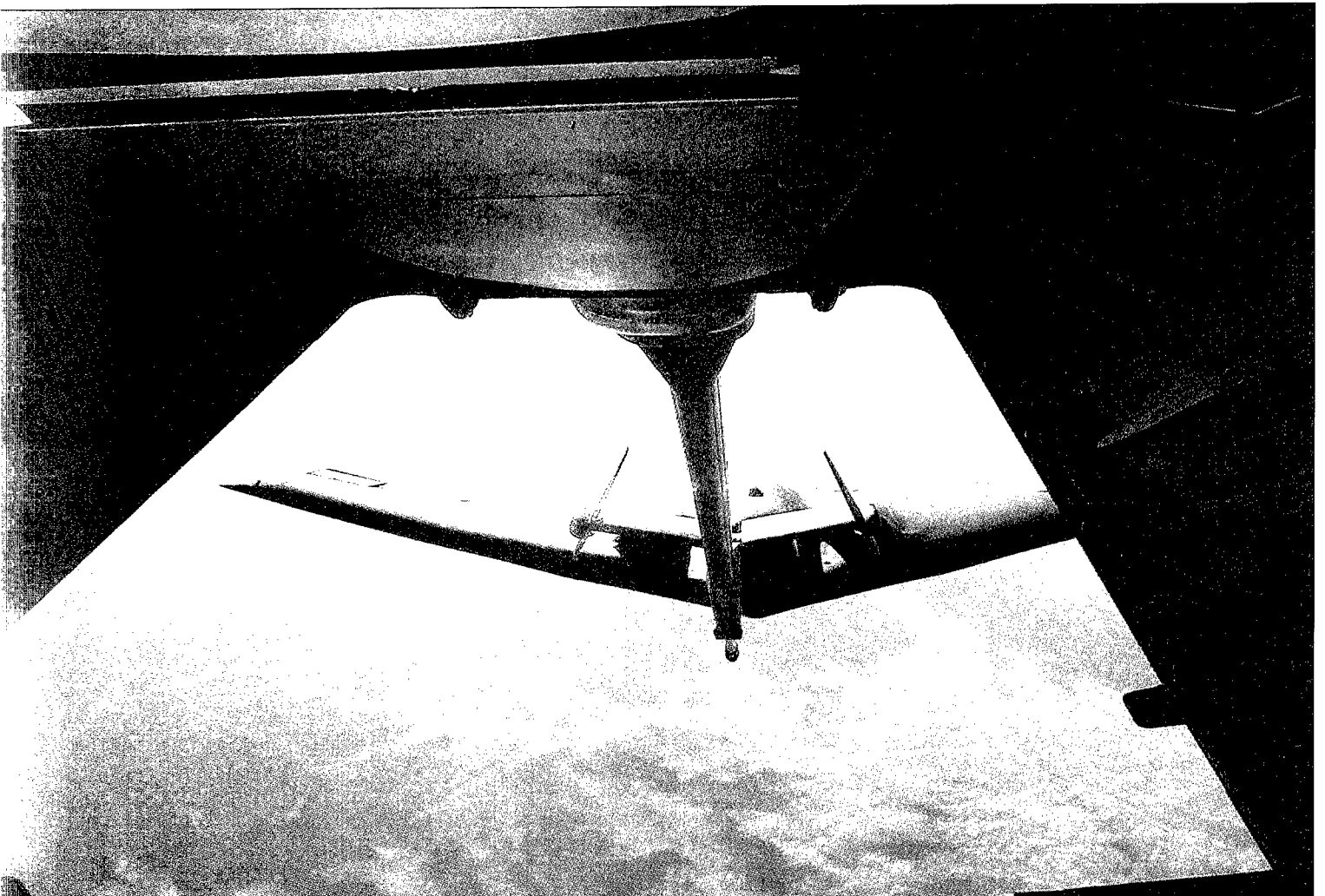
operations. Each service or agency will own and operate its own space resources. However, Air Force stewardship will ensure DoD space programs meet everyone's requirements, while maximizing limited dollars and eliminating interservice competition and duplication.

The immediate need is for a modernized space surveillance network that provides coverage required to characterize and track all space threats in a timely manner. Threats will come from a variety of sources.

Ballistic/Cruise Missile Defense

In the future, countering threats from air and space will become the Air Force's standard mode of operations. The Air Force must aggressively counter the rapidly growing theater and global threat posed to Americans and U.S. interests by cruise and ballistic missiles. As part of a national and theater air and space defense system, the service must develop and provide capabilities that emphasize warning, attack opera-

A B-2 refuels.
The stealth bomber
gives the Air Force
a strike capability
that will last well
into the next century.



tions and intercept of ballistic and cruise missiles.

New Air Force initiatives, combined with the Ballistic Missile Defense Organization's and other agencies' space-based laser and interceptor research and development programs will help neutralize future global targets.

Battle Management/Command and Control

The Air Force is uniquely capable of providing a full range of air and space sensors and fusion and display systems to build the coherent, integrated, air, land and space picture of the battlespace. These systems will give joint force commanders an integrated global and theater picture of the battlespace and enable them to control and execute the integrated employment of air and space forces in conjunction with land and maritime assets.

Future joint team commanders will see a common operational picture. They will have complete flexibility to pull needed information while the system automatically presents relevant data triggered by key events.

Alternative space radar configurations, unmanned aerial vehicle communications relays, advanced satellite technology and high-frequency radio are some tools the Air Force will test to give field commanders the big picture they need.

Unmanned Aerial Vehicles

The Air Force will aggressively exploit unmanned aerial vehicle technology for near-term support of intelligence, surveillance, reconnaissance, communications and mid-term suppression of enemy air defenses. Four essential missions are planned:

- Intelligence, surveillance and reconnaissance vehicles would initially augment existing systems to provide the Air Force with responsive and sustained intelligence data from anywhere in the battle space, during adverse weather, day or night.

- Communications relay vehicles would initially augment theater communications when the normal infrastructure has not been established.

- Unmanned aerial vehicles would



Air Force security troops hit the dirt during Exercise Air Warrior II at Fort Polk, La.

augment other nonlethal systems that suppress enemy air-defenses by jamming radar and communications at standoff and close-in distances.

- Combative unmanned aerial vehicles would augment manned systems in detecting, identifying and destroying targets.

Although the Air Force is optimistic about the future widespread use of unmanned aerial vehicles, it would initially deploy the vehicles to act in concert with other space, airborne, maritime and ground systems until their capabilities and cost-effectiveness for each mission are proven.

In developing these vehicles, the Air Force will exploit existing commercial and military technologies. To keep costs down, mission control elements will employ a common, interoperable architecture.

Presence/Power Projection

A regionally balanced, robust mixture of forward-based and rotationally deployed forces will enable the Air Force to project air power rapidly anywhere in the world to meet the nation's security needs in a changing and uncertain environment.

In the 21st century, the Air Force will rely increasingly on robust, flexible and survivable air expeditionary forces that can both provide presence and project power. Over time, the service also will increase its reliance on long-range and space-based assets to project power.

Through its air expeditionary force battle lab, the Air Force will study the ability of force structure (Guard, Reserve, active duty

In the 21st century, the Air Force will rely increasingly on robust, flexible and survivable air expeditionary forces that can both provide presence and project power.

and joint units) to decrease its response times. A parallel study is needed, however, to determine technologies required to decrease those times. The results of these studies will help the Air Force develop an optimal presence strategy to pre-position systems and resources. The goal is to decrease response times to less than 36 hours for any military option.

Nuclear Operations, Planning and Support

The Air Force will sustain its nuclear deterrent forces and increase efforts to deal with the growing risk of nuclear weapons, both at home and abroad. The Air Force nuclear forces of 2025 will be able to provide nuclear operations for unified commands and be able to respond to any nuclear contingency. To support NATO require-

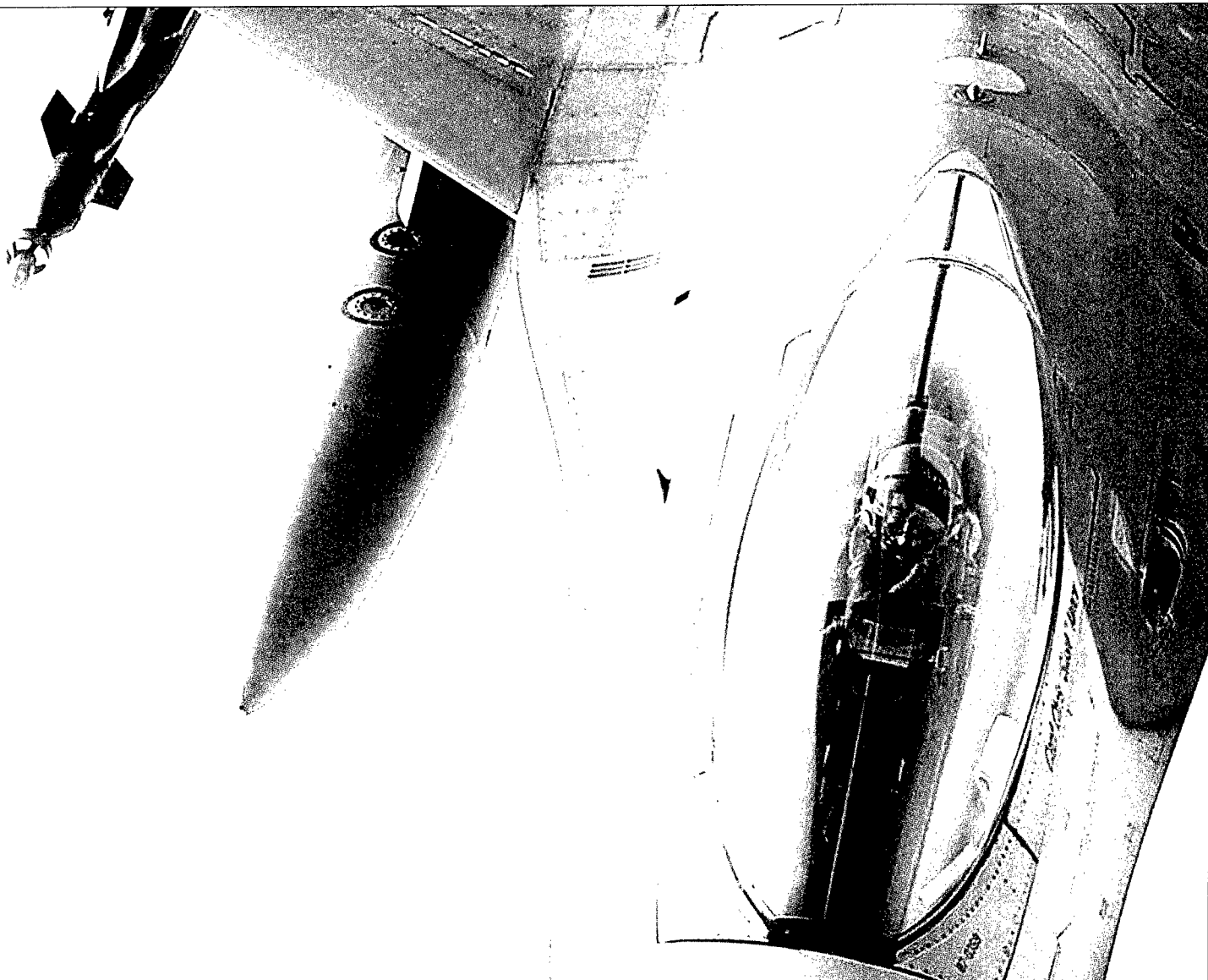
ments, the service is committed to positioning and funding dual-capable aircraft in NATO countries.

Current Air Force nuclear weapon systems remain reliable and capable throughout their operational life of responding worldwide. At some point, however, some replacement and modernization will be necessary for our Minuteman and cruise missiles and for nuclear command and control systems.

Protecting nuclear assets in the future also will require upgrading. The long-range plan calls for the service to use the Nuclear Surety Special Management Review and the Air Force Space Command's ICBM nuclear security process action team report to identify measures required to enhance nuclear security.

The plan also mandates a study of near-

An F-16C refuels from
a National Guard
KC-135 during
Operation Joint
Guard.



and mid-term nuclear bomber and dual-capable aircraft-basing viability. This study will assess surety, security and survivability of existing bases, their nuclear support infrastructure and the means to ensure nuclear force survivability for the long term.

Information Operations

The Air Force will aggressively expand its efforts in defensive information operations as it continues to develop its offensive capability. The Air Force already leads in garrison computer system defense and will move to defend its forward-deployed assets. The service will emphasize its efforts at the operational, tactical and strategic levels.

Force Mix

The Air National Guard and Air Force Reserve will continue to be integral to the service's Total Force concept. To maximize efficiency and operational effectiveness with constrained resources, the Air Force will look for new ways to:

- Involve the Air Guard and Reserve in new mission areas;
- Optimize its associate wing concept, to include "reverse associate" units. Under the current concept, Reserve associates use an active duty unit's facilities, equipment and weapon systems and complement that unit's overall mission. Reverse arrangements would include the Guard and permit units of any total force component to associate with another component's unit.
- Broaden and strengthen the use of individual mobilization augmentees and Guard assistants to back up active duty billets.

The end goal is an efficient and operationally effective total force that is sustained through a continuous review of the active/Guard/Reserve force mix. The optimal total force of the future should include shifting missions and activities to the reserve components whenever possible.

Acquisition Management

The Air Force seeks to consolidate weapon systems management centers of excellence, balancing infrastructure costs with required capabilities and emphasizing joint acquisi-



tion teams. Five goals will drive this effort:

- An integrated product team will develop an Air Force strategy for intra- and interservice consolidation, realignment and transfer. The team will work with the Air Force's corporate effort to develop strategic direction for basing.
- A review board consisting of uniformed, government civilian and industry experts will review mission-essential tasks and inherently governmental functions. The board will identify outsourcing candidates and costs and review best practices.
- The intraservice Vision 21 strategy provides for a single-laboratory concept. The lab will replace the four current laboratories and the Air Force Office of Scientific Research, providing streamlined management, reduced duplication, and consolidated, full-resource ownership and accountability.
- Integrated weapon systems management will clearly define authority and responsibility for the single manager and define relationships with other players. The management concept is marked by a strong integrated product team structure with the original equipment manufacturer and principal supporting contractors. The life-cycle phase of systems and locus of activity would determine where the manager is located.

■ Institutionalized acquisition reform, guided by strategic business practices, will result in "best value" procurements with minimum government infrastructure.

A Minuteman III ICBM launches from Vandenberg Air Force Base, Calif., during a test of the system.

The Air National Guard and Air Force Reserve will continue to be integral to the service's Total Force concept.

Innovation Takes Wing

Battlelabs are fundamentally different from traditional research laboratories. They're not technology places, but places where people look at new ways of employing equipment and new ways of thinking about a particular discipline.

Opened this year, the Air Force's six battlelabs reflect the service's commitment to innovation. They illustrate a key theme of the strategic vision "Global Engagement: A Vision for the 21st Century Air Force."

Three labs operate under the direction of the Air Combat Command, Langley Air Force Base, Va.:

- ☐ Air Expeditionary Force Battlelab, Mountain Home Air Force Base, Idaho;
- ☐ Command and Control Battle Management Battlelab, Hurlburt Field, Fla.; and
- ☐ Unmanned Aerial Vehicle Battlelab, Eglin Air Force Base, Fla.

The others are:

- ☐ Force Protection Battlelab, Air Force Protection Group, Lackland Air Force Base, Texas;
- ☐ Information Warfare Battlelab, Air Intelligence Agency, Kelly Air Force Base, Texas; and
- ☐ Space Battlelab, Air Force Space Command, Falcon Air Force Base, Colo.

Small in size, the labs rely on field ingenuity to identify innovative operational and logistical concepts that advance Air Force core competencies. They draw upon established Air Force organizations, capabilities and expertise to measure the potential of suggestions.

Air Force battlelabs work with the other services' labs to obtain service-unique expertise and capabilities, share ideas on joint warfighting, participate in joint exercises, and evaluate operational concept impacts on joint warfighting.

Each battlelab employs a cadre of no more than 25 people. Video teleconferencing and the Internet help the staffs identify and share ideas rapidly. Using the battlelab planning cell, an on-line forum, the labs plan together and with others to demonstrate and measure the worth of promising concepts.

Battlelabs represent small investments — a little money and a few focused people — that can reap big dividends by rapidly proving ideas that could enhance Air Force global operations. Combat experience, technology or the desire to employ forces more effectively and efficiently drive the ideas battlelabs entertain.

The battlelab process focuses new ideas with a demonstration mission statement. The statement defines an idea's potential significance to Air Force core competencies and how evaluators will measure its performance and merits. The mission statement may indicate alternative courses of action by sharpening the focus of an idea and identifying various strategies to accomplish

objectives, associated risks and required resources.

Because initiatives can encompass several mission or functional areas, they frequently involve more than one lab. Then, too, the development and demonstration of initiatives also draw on experts and capabilities throughout the Air Force.

Courses of action may range in scope from full modeling and simulation to field demonstrations to tests in actual combat environments. Each course requires a specific structure in scope, nature and objectives. Consequently, battlelabs must turn concepts into some practical field use that can be measured and evaluated.

These exploratory capabilities are inextricably tied to innovation and timeliness — the rapid exploitation of demonstrable ideas. To accomplish this, battle labs develop a campaign for each initiative that allows further definition and scope. The Air Force classifies these initiatives in terms of scope as Mitchell Class or Kenney Class.

Mitchell Class initiatives typically involve more than one battlelab. They may be revolutionary, complex or costly; they must be accomplished:

- ☐ With executable year funding;
- ☐ Under the auspices of the major command to which the battle lab is assigned;
- ☐ Within a specified time frame (usually 18 months); and
- ☐ Within resource constraints specified by the Air Force board of directors and consistent with the selected course of action.

The lead battlelab for a Mitchell Class initiative acts as the agent for cooperative planning and in concert with the battle lab planning cell. With the planning cell's approval, the lead battlelab presents a campaign concept and courses of action to its major command for approval. If the command approves, it selects the course of action and recommends the initiative for presentation to the Air Force board of directors through the Air Force Requirements Oversight Council.

Kenney Class initiatives normally involve just one battlelab. Innovative and relatively straightforward, they also cost less than Mitchell Class initiatives. Kenney Class initiatives must be accomplished:

- ☐ With a battlelab's assigned Kenney Class funds;
- ☐ Under the auspices of a major command or equivalent;
- ☐ Within 18 months typically; and
- ☐ With resources maintained by the major command or equivalent.

Each battlelab and its supporting command determine the merit of pursuing candidate Kenney Class initiatives and the methods of evaluation. When more than one battlelab participates, the major command heading the project selects a lead battlelab.

Test and Evaluation Infrastructure

The Air Force seeks to eliminate unnecessary overlap and redundancy with other DoD, federal and commercial test facilities. The long-range plan establishes a triservice process to identify, acquire and locate next-generation test and evaluation capabilities.

For future flight testing, the Air Force envisions using modeling and simulation as the primary means of measuring system performance during test and evaluation. Flight testing will focus on refining, verifying and validating performance models and engineering data packages.

Sustainment

The Air Force invests in modifications affecting reliability and maintainability of existing weapon systems, because they reduce sustainment needs. The Air Force also must ensure reliability is built into all new systems.

To reduce support costs, the Air Force will re-engineer processes. It will compete selected support functions and partner with private-sector contractors to use excess depot capacity.

These and related actions will produce:

- A logistics command and control capability to plan, prepare, deploy, sustain and reconstitute forces across the spectrum of military operations;
- Assured, time-definite battlefield delivery and distribution;
- A lean and responsive depot structure using performance-based business processes and metrics to improve financial performance and lean logistics; and
- Weapon systems with high reliability, low life-cycle costs and a small mobility footprint.

Basing

The Air Force reaffirms its commitment to preserve a sense of community at its bases, maintaining high quality of life standards while searching for new and more efficient ways of providing them.

Innovation

A vigorous program of experimenting, testing, exercising and evaluating new

operational concepts and systems guides the service's approach to future air and space power. Innovation will ensure the Air Force's core competencies will meet the challenges of tomorrow.

Six small, focused battlelabs are at the heart of Air Force innovation. The labs rely on field ingenuity to identify operational and logistical concepts for advancing Air Force competencies in these areas: battle management, unmanned aerial vehicles, information warfare, air expeditionary force, space, and force protection. These labs will draw upon total force capabilities and expertise to measure the potential of introduced concepts. They'll use modeling, simulation and actual employment of exploratory capabilities in operational environments.

Successful initiatives should drive revisions in organization, doctrine, training, requirements and acquisitions.

Core Values

The Air Force long-range plan reaffirms the fundamental and timeless nature of the service's core values — integrity first, service before self and excellence in all the service does.

A values-based Air Force using modern technology and operational concepts is fundamental to becoming the world's most powerful space and air force. Technology and tactics are not enough. They must be brought together by quality people who embrace a proud Air Force heritage of core values, history, mission and professionalism.

Education, leadership and accountability provide a framework to imprint shared core values. The Air Force will focus on them to continuously reinforce core values in all activities.

"Global Engagement: A Vision for the 21st Century Air Force" charts a course into a future in which dramatic changes wrought by technology will be the norm. In that future, the core values of service, integrity and excellence will sustain Air Force men and women. Most importantly, the service's strategy for U.S. air and space power will provide the power projection and rapid response the nation will demand in the new millennium.❖

Innovation will ensure the Air Force's core competencies will meet the challenges of tomorrow.



Joint Vision 2010

will be the
impetus and
foundation
as the U.S.
military faces
dynamic change,
constrained
resources,
potential new
roles and rapid
technological
advancement.

DEFENSE '98 GOES ONLINE

In the spirit of the Defense Reform Initiative, this is the last hard-copy issue of *Defense* magazine. *Defense '98* will be available online in a few weeks on the American Forces Information Service home page at www.defenselink.mil/afis.